

Low to medium pressure gauges and gaugecocks for direct visual identification of liquid levels



**N2 GAUGECOCKS** 



### **FEATURES**

- Reliable, easy to understand level reference.
- Gives users the ability to inspect liquid characteristics visually.
- Non-intrusive.
- No electrical power required. Provide accurate direct liquid level measurement in remote locations where power is not available. Not affected by power failures.
- Provide a near-unlimited length of measure.
- Plain transparent and redline glass available.
- Wide range of glass protectors provide improved protection.
- Glass unions provide superior pressure and temperature ratings.
- Can be supplied to meet ASME requirements.
- Straight and offset pattern gaugecocks available.
- Ball check shut-off prevents loss of process fluid in the event of an accidental breakage of the gauge glass.

# GENERAL APPLICATION

Used to register liquid levels in low to medium pressure applications in the petroleum, chemical and general process industries, including steam boiler service.

# **TECHNICAL DATA**

Materials

Glass: High pressure, heavy wall

or red line

Gaugecocks: Bronze, iron, steel,

stainless steel

Glass size:  $$\,^{5}\!\!\%"$ and <math display="inline">^{3}\!\!4"$  (DN 18 and 20)

Connections:  $\frac{1}{2}$ " to 1" (DN 15 to 25)

Pressure ratings

Glass: to 600 psi (41.4 bar)
Gaugecocks: to 750 psi at 100°F

(51.7 bar at 38°C)

Temperature rating

Glass: to 425°F (218°C)
Gaugecocks: -300°F to 750°F

(-184°C to 399°C)

**GAUGES** 

#### OVERVIEW

Penberthy tubular glass gauges are mounted to the vessel externally and use tubular glass to provide direct visual verification of the liquid level present. The transparent glass also provides an excellent means to inspect fluid characteristics optically.

Liquid enters the gauge through the lower tank connection. The meniscus present in the glass tube corresponds to the liquid level in the tank.

A wide range of accessories allows you to customize each gauge to your specific application requirements. These options can also provide enhanced level indication and protection for the tubular glass.

#### **Protectors**

Tubular glass is susceptible to accidental breakage. To counteract this condition, a variety of protectors is offered which prevent damage to the glass but do not restrict level indication capability. In some cases the protector actually enhances it. Protectors can be adapted to fit most major manufacturers' gaugecocks.

Guard rods - Two or four metallic rods placed next to the glass tube.

Plastic or wire glass - A transparent box surrounding the tubular glass constructed from either clear plastic or wire glass.

Sheet metal - Two pieces of sheet metal formed to protect both sides of the tubular glass. The front and back are left open to facilitate easy viewing.

Refractive - An extruded aluminum channel with a choice of either a polymer or glass cover. The interior is a white anodized finish with 45° angle red stripes on the back wall. As the gauge fills, liquid passes in front of the stripes. The refractive nature of the liquid changes the stripe angle showing the highly visible contrast between liquid presence and absence.

If water is the liquid used, the stripes become horizontal. Liquids with a refractive index less than water will alter the angle less, higher indexes will alter the angles more. The refractive protector is designed for use with standard tubular glass.

# Internal heating or cooling tubes

A stainless steel internal heating or cooling tube that passes through the length of the tubular glass can be used in conjunction with an offset pattern gaugecock and high pressure glass.

Intended for use in gauges over 48" in height, it allows you to join two pieces of glass within the same gauge. This increases the length of the gauge, yet maintains the same pressure/temperature rating as the individual pieces of glass. Glass unions should be used in conjunction with the refractive protector to provide mechanical stability.



N2 GAUGECOCKS





N7 GAUGECOCKS

TABLE 1 - PRESSURE/TEMPERATURE RATINGS FOR GAUGES WITH A SINGLE PIECE OF TUBULAR GLASS (BOTH 5/4" AND 3/4")

Center to center distance for vessel	No corrosion up	to 150°F (66°C) p	sig (kPa)	Steam boiler serv	iteam boiler service up to 425°F (218°C) psig (kPa)		
connections inch (mm)	High pressure	Heavy wall	Red line	High pressure	Heavy wall	Red line	
10 ( 254)	410 (2830)	600 (4140)	340 (2340)	310 (2140)	345 (2380)	275 (1900)	
15 ( 381)	385 (2650)	600 (4140)	310 (2140)	280 (1930)	325 (2240)	265 (1830)	
20 ( 508)	355 (2450)	600 (4140)	285 (1960)	265 (1830)	315 (2170)	260 (1790)	
25 ( 635)	300 (2070)	580 (4000)	260 (1790)	250 (1720)	300 (2070)	250 (1720)	
30 ( 762)	275 (1900)	550 (3790)	230 (1590)	-	-	-	
35 ( 889)	240 (1650)	500 (3450)	200 (1380)	-	-	-	
40 (1016)	210 (1450)	420 (2890)	180 (1240)	-	-	-	
45 (1143)	200 (1380)	360 (2480)	170 (1170)	-	-	-	
50 (1270)	180 (1240)	340 (2340)	160 (1100)	-	-	-	
55 (1397)	150 (1030)	N/A	140 ( 970)	-	-	-	
60 (1524)	140 ( 970)	N/A	120 ( 830)	-	-	-	
65 (1651)	125 ( 860)	N/A	100 ( 690)	-	-	-	
70 (1778)	100 ( 690)	N/A	90 ( 620)	-	-	-	

Using secured glass unions and multiple pieces of tubular glass will increase the pressure/temperature rating over that of an equivalent length of single glass.

TABLE 2 - TEMPERATURE RATINGS FOR TYPICAL PACKING MATERIAL

Packing Type	Maximum temperature rating °F (°C)
Grafoil® (standard)	425 (218)
Teflon®	425 (218)
Neoprene®	300 (149)
Viton®	400 (204)

TABLE 3 - OPTIONS AVAILABLE FOR THE DIFFERENT TYPES OF TUBULAR GLASS

TABLE 3 - OF HONS AVAILABLE FOR THE DIFFERENT TIPES OF TOBULAR GLASS											
Glass type		Options									
(both 5/8" and 3/4")	Gaugecocks	Hydraulic adapters	Guard rods	Plastic or wire glass protector	Sheet metal	Refractive protector	Internal tube				
High pressure	Χ	Χ	X	X	Χ	Χ	Χ				
Heavy wall	Χ	Χ	Χ	X	X	-	-				
Red line	X	Χ	X	X	X	-	-				
Glass union	Χ	Χ	-	-	-	Χ	Χ				

### Hydraulic adapters

Hydraulic adapters are used in place of gaugecocks for connecting the gauge to the vessel. They attach directly to the ends of the tubular glass, providing a ½" NPT male connection. This allows you to incorporate most standard hydraulic connections currently available.

### **Dimensions**

To obtain the length of glass tubing needed to make up a gauge set for given vessel center-to-center dimension:

 ${\tt Glass\ tubing\ length = (vessel\ center-to-center\ dimension) - (dimension\ X)}$ 

To obtain the length of guard rods for given gaugecock center-to-center dimension:

Guard rod length = (gaugecock center-to-center dimension) - (dimension Y)

### **TUBULAR GLASS DIMENSIONS**

Companyly Madel	Required Length (Inches)						
Gagecock Model	Tubular Glass	<b>Guard Rods</b>					
N2	-1.875	-2.375					
K2	-1.875	-2.375					
N7	-2.000	-0.750					

GAUGECOCKS

#### OVERVIEW

Penberthy tubular glass gaugecocks are for use in low to medium pressure applications. Available in offset and straight patterns, they isolate the tubular glass from the liquid contents of the vessel

They are available with a combination of features for a range of uses, including union or solid shank vessel connections and a choice of stuffing box sizes for various glass diameters. All stuffing box connections are designed for positive seal with minimum radial compression.

Gaugecock seat leakage is Class I per ISA RP39.6, FCI 70-2 (formerly ASME B16. 105) and/or IEC 60534-4.

Offset gaugecocks have the advantage of permitting the inside of the tubular glass to be cleaned easily with a minimum of disassembly. By removing the vent and drain plugs (or other connection), a straight passage is opened through the tubular glass. A brush can be inserted through the gaugecock vent and drain for glass cleaning.

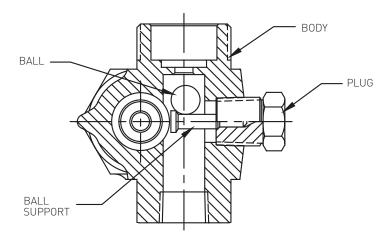
#### Automatic ball check shut-off

To prevent rapid loss of fluid in the event of accidental glass breakage, Penberthy gaugecocks are supplied with automatic ball check shut-off. Should the glass break, the pressure drop causes the ball checks to seat to prevent loss of tank contents. To unseat these ball checks during the liquid level readings, the tip of the gaugecock stem has an extension that pushes the ball away from its seat while allowing the gauge column to fill as liquid contents pass around the ball. Stainless steel retainers prevent reverse seating of balls or loss of balls during installation.

Both upper and lower gaugecocks in each set are equipped with horizontal ball checks. Balls are located on the vessel side of the gaugecock seats.

Gaugecocks with ball checks omitted meet ASME boiler requirements. As an alternative method to ASME boiler requirements, the lower gaugecock is available with an optional vertical rising ball check located in the offset portion of the gaugecock body and the upper gaugecock has a leaky seat.

# VERTICALLY RISING BALL CHECK



# SERIES N2/K2 OFFSET PATTERN GAUGECOCKS

### **OVERVIEW**

The N2 and K2 Series include models N2A/K2A, N2B/K2B and N2C/K2C. They are offered in steel or 316 stainless steel materials, in  $\frac{1}{2}$  to 1" (DN 15 to 25) sizes, with a 300 P-CL ANSI rating and a wide range of features in offset pattern design.

Pressure (max.): 750 psi at 100°F (51.7 bar at 38°C) Temperature range: -300°F to 750°F (-184°C to 399°C)

### **FEATURES**

- Offset pattern allows easy cleaning.
- Integral bonnet (N2 series).
- Union bonnet (K2 series).
- Union vessel connection.
- Ball check shut-off prevents loss of process fluid in the event of an accidental breakage of the tubular glass.
- Integral seat (N2 series).
- Threaded renewable seat (K2 series).
- Can be supplied to meet ASME requirements.
- Wide variety of vessel connections available.

A variety of optional features are available when specified. Optional materials can be specified for the gaugecock body and trim (trim consists of the stem, stem packing retainer, ball check and seat [K2 series only]). Standard and optional materials conform to ASTM specifications.

### **ASME Boiler Code**

Series N2 and K2 gaugecock sets that are acceptable for ASME Boiler Code are available as an option.

For steam/water service in excess of 350 psi [24 bar], transparent flat glass gauges with tubular adapters and shields are recommended.

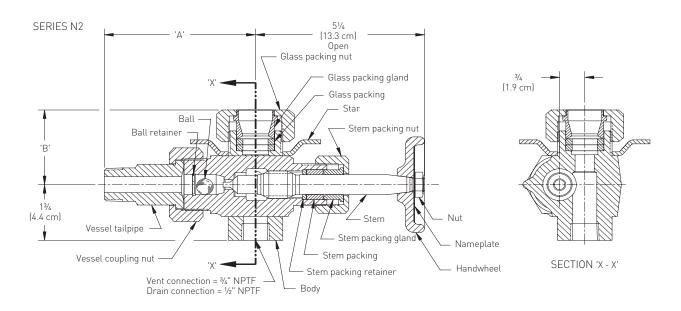
### TABLE 4 - CENTER-TO-CENTER AND GUARD ROD DIMENSIONS (SEE DIMENSIONS ON PAGE 6)

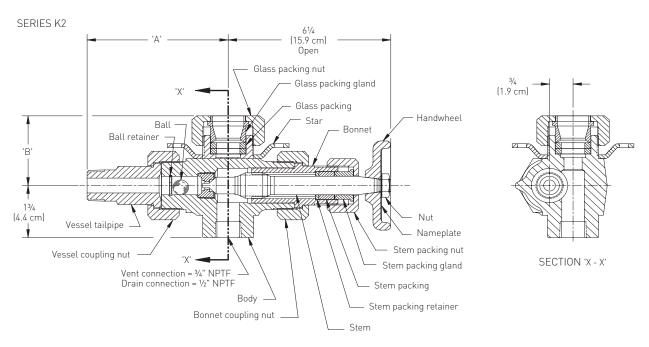
Model	Dimension X, in. (cm)	Dimension Y, in. (cm)
All models	17/8 (4.8)	23/8 (6.0)

# TABLE 5 - PRESSURE/TEMPERATURE (SUBJECT TO LIMITATIONS OF TUBULAR GLASS)

	Maximum working pressure psi (kPa) at temperatures to:								
Model	-300°F (-184°C)	-20°F (-29°C)	100°F (38°C)	300°F (149°C)	400°F (204°C)	500°F (260°C)	750°F (399°C)		
Steel and 316 STS (N2A/K2A)	675 (4650)	675 (4650)	675 (4650)	610 (4210)	590 (4070)	555 (3830)	400 (2760)		
Steel and 316 STS (N2B/K2B, N2C/K2C)	750 (5170)	750 (5170)	750 (5170)	675 (4650)	655 (4520)	610 (4210)	450 (3100)		

SERIES N2/K2 OFFSET PATTERN GAUGECOCKS





**TABLE 6 - N2/K2 DIMENSIONS** 

Connection	Dimension 'A' in inch (cm)	Dimension 'B' in inch (cm)
Union		
½" NPTM	43/8 [11.1]	-
3/4" NPTM	41/2 [11.4]	-
1" NPTM	45/8 (11.7)	-
Socketweld		
½" Male union	43/8 (11.1)	-
¾" Male union	41/2 [11.4]	-
1" Male union	45/8 (11.7)	-
Flanged		
½"-150 P-CL R.F.	45/8 (11.7)	-
1/2"-300 P-CL R.F.	45/8 (11.7)	-
3/4"-150 P-CL R.F.	43/4 (12.1)	-
3/4"-300 P-CL R.F.	4¾ (12.1)	-
1"-150 P-CL R.F.	47/8 (12.4)	-
1"-300 P-CL R.F.	47/8 (12.4)	-

Connection	Dimension 'A' in inch (cm)	Dimension 'B' in inch (cm)
Spherical union		
½" NPTM	49/16 (11.6)	-
¾" NPTM	49/16 (11.6)	-
Stuffing box		
%" Dia. glass	-	21/4 (5.7)
¾" Dia. glass	-	21/4 (5.7)
Protector nut	-	21/8 (7.3)

SERIES N2/K2 OFFSET PATTERN GAUGECOCKS

**TABLE 7 - SERIES N2 MATERIALS** 

		RIES N2 MATE		Standard m	aterials				
Ref.			Carbon steel	STS construction	Sour gas service	Low-temp.			
no.		ription	to -20°F	to -325°F	to -20°F	to -50°F	Optional materials		
11	Body		ASTM A105 (forged) Carbon steel	ASTM A182 (forged) Gr. F316/F316L STS	ASTM A105 (forged) Carbon steel per NACE MR0175 and/or MR0103	ASTM A350 (forged) Carbon steel Gr. LF2 Cl. 1	ASTM A351 304/304L STS Gr. CF3 ASTM A351 316/316L STS Gr. CF3M ASTM A182 Gr. F304/F304L STS ASTM A182 Gr. F51 Duplex 2205 STS ASTM A494 Hastelloy B® Gr. N-12MV ASTM A352 Carbon steel Gr. LCC ASTM A743 Alloy 20 Gr. CN7M ASTM B564 Monel® 400 N04400 ASTM A494 Hastelloy C® Gr. CW12MW		
12	\/	1 +=11=1==	ASTM A108	ASTM A276		ASTM A350	ASTM A123 Galvanized steel ASTM A276 304/304L, Duplex 2205 ST		
12	vesse	l tailpipe	Carbon steel AISI C1018	316/316L STS	ASTM A108 Carbon steel AISI C1018 per NACE MR0175	Carbon steel Gr. LF2 Cl. 1	ASTM B164 Monel® 400 ASTM B473 Alloy 20 [CARP 20Cb3]® ASTM B335 Hastelloy B®		
13	Vesse	l coupling nut	ASTM A108 Carbon steel AISI C1018	Investment cast 316 STS	and/or MR0103	Investment cast 316 STS	ASTM B574 Hastelloy C <sup>®</sup> 276 ASTM A123 galvanized steel		
4	Ball r	etainer		ASTM A313 316 ST	S (spring wire)		None		
15	Σ	Ball		ASTM A493, A262 o	or A276 316 STS		ASTM B574 Hastelloy C° 276 Borosilicate glass ASTM B473 Alloy 20 (CARP 20Cb3)° ASTM B164 Monel° 400 ASTM B335 Hastelloy B° CRS 304 STS		
17	_ ~	Stem	ASTM A582	ASTM A276	ASTM A276	ASTM A582	ASTM A276 Duplex 2205 STS ASTM A276 316/316L STS		
17	-	Stern	416 STS or ASTM A276 410 STS	316/316L STS	316/316L STS per NACE MR0175 and/or MR0103	416 STS or ASTM A276 410 STS	ASTM A276 304/304L STS ASTM A276 Duplex 2205 STS ASTM B164 Monel® 400		
18		Stem packing retainer		MPIF SS-316N2-33 3	316 STS (sintered)	ASTM B473 Alloy 20 (CARP 20Cb3)® ASTM B335 Hastelloy B® ASTM B574 Hastelloy C® 276			
19 25		packing gland packing		Graphite co	mposite		Teflon®		
26	Ctom	packing nut	ASTM A108	Investment cast	ASTM A108	Investment cast	Viton® ASTM A276 304/304L, Duplex 2205 ST		
20	Sterri	packing nut	Carbon steel AISI C1018	316/316L STS	Carbon steel AISI C1018	316/316L STS	ASTM B164 Monel® 400 ASTM B473 Alloy 20 (CARP 20Cb3)® ASTM B335 Hastelloy B® ASTM B574 Hastelloy C® 276 ASTM A123 galvanized steel		
28	Hand	wheel		ASTM A216 Carbon ASTM A563 S			None		
0		heel or lever		None None					
33 34	Star Glass	packing		ASTM A108 Carbon steel AISI C1020  Graphite composite					
36	Glass packing gland			Viton®  ASTM A276 316/316L STS  ASTM A276 304/304L STS  ASTM A276 Duplex 2205 STS  ASTM B164 Monet® 400  ASTM B473 Alloy 20 (CARP 20Cb3)®  ASTM B335 Hastelloy B®  ASTM B574 Hastelloy C® 276					
37	Glass	packing nut	ASTM A108 Carbon steel AISI C1018	Investment cast 316/316L STS	ASTM A108 Carbon steel AISI C1018	Investment cast 316/316L STS	ASTM A276 304/304L STS ASTM A276 Duplex 2205 STS ASTM B164 Monel® 400 ASTM B473 Alloy 20 (CARP 20Cb3)® ASTM B335 Hastelloy B® ASTM B574 Hastelloy C® 276 ASTM A123 Galvanized steel		
40	Guard	l rods	ASTM A108 Carbon steel AISI C1018	ASTM A276 304/304L STS	ASTM A108 Carbon steel AISI C1018	ASTM A276 304/304L STS	None		

SERIES N2/K2 OFFSET PATTERN GAUGECOCKS

# TABLE 8 - SERIES K2 MATERIALS

				Standard m				
ef.			Carbon steel	STS construction	Sour gas service	Low-temp.		
١.	Descri	ption	to -20°F	to -325°F	to -20°F	to -50°F	Optional materials	
	Body		ASTM A105	ASTM A182	ASTM A105 (forged)	ASTM A350	ASTM A351 304/304L STS Gr. CF3	
			(forged)	(forged)	Carbon steel per	(forged)	ASTM A351 316/316L STS Gr. CF3M ASTM A182 Gr. F304/F304L STS	
			Carbon steel	Gr. F316/F316L	NACE MR0175	Carbon steel	ASTM A182 Gr. F304/F304L 515 ASTM A182 Gr. F51 Duplex 2205 STS	
				STS	and/or MR0103	Gr. LF2 Cl. 1	ASTM A494 Hastelloy B® Gr. N-12MV	
							ASTM A352 Carbon steel Gr. LCC	
							ASTM A743 Alloy 20 Gr. CN7M	
							ASTM B564 Monel® 400 N04400	
							ASTM A494 Hastelloy C® Gr. CW12MW	
							ASTM A123 Galvanized steel	
	Vessel	tailpipe	ASTM A108	ASTM A276	ASTM A108	ASTM A350	ASTM A276 304/304L STS ASTM A276 Duplex 2205 STS	
			Carbon steel	316/316L STS	Carbon steel	Carbon steel	ASTM B164 Monel® 400	
			AISI C1018		AISI C1018 per	Gr. LF2 Cl. 1	ASTM B473 Alloy 20 (CARP 20Cb3)®	
					NACE MR0175		ASTM B335 Hastelloy B®	
	Vessel	coupling nut	ASTM A108 Carbon steel	Investment cast	and/or MR0103	Investment cast	ASTM B574 Hastelloy C® 276	
			AISI C1018	316 STS	and/or MR0103	316 STS	ASTM A123 Galvanized steel	
	Ball re	tainer		ASTM A313 316 ST	'S (spring wire)		None	
		Ball					ASTM B574 Hastelloy C <sup>®</sup> 276	
							Borosilicate glass	
				ACTM 4/00 40:0	A07/ 01/ CTC		ASTM B473 Alloy 20 (CARP 20Cb3)®	
				ASTM A493, A262 o	or AZ/6316515		ASTM B164 Monel® 400 ASTM B335 Hastellov B®	
							ASTM B335 Hastelloy B* CRS 304 STS	
	Σ						ASTM A276 Duplex 2205 STS	
	~	Seat		ASTM A276 31	6/316L STS		ASTM A276 316/316L STS	
	F	Stem	ASTM A582	ASTM A276	ASTM A276	ASTM A582	ASTM A276 304/304L STS	
			416 STS or ASTM A276	316/316L STS	316/316L STS per	416 STS	ASTM A276 Duplex 2205 STS	
			410 STS		NACE MR0175 and/or	or ASTM A276	ASTM B164 Monel® 400	
			410010		MR0103	410 STS	ASTM B473 Alloy 20 (CARP 20Cb3)®	
		Stem packing			1411.0100	410 313	ASTM B335 Hastelloy B®	
		retainer MPIF SS-316N2-33 316 STS (sintered)					ASTM B533 Hastelloy C® 276	
	Stem n	acking gland						
	Bonnet				ASTM A108			
					Carbon steel	ASTM A350	ASTM A276 304/304L STS	
			ASTM A108 Carbon steel	ASTM A276	AISI C1018 per	Carbon steel	ASTM A276 Duplex 2205 STS	
			AISI C1018	316/316L STS	NACE MR0175	Gr. LF2 Cl. 1	ASTM B164 Monel® 400	
					and/or MR0103	OI. LI Z Gt. I	ASTM B473 Alloy 20 (CARP 20Cb3)®	
					ASTM A108		ASTM B335 Hastelloy B®	
	Bonnet	NI. 4	ASTM A108 Carbon steel	Investment cast	Carbon steel	Investment cast	ASTM B574 Hastelloy C <sup>®</sup> 276	
	Bonnei	Nut	AISI C1018	316 STS		316 STS	ASTM A123 Galvanized steel	
	C+				AISI C1018		Teflon®	
	Stem p	acking		Graphite co	mposite		Viton®	
	Stem p	acking nut	ASTM A108	Investment cast	ASTM A108	Investment cast	ASTM A276 304/304L, Duplex 2205 STS	
	'	-	Carbon steel	316/316L STS	Carbon steel	316/316L STS	ASTM B164 Monel® 400	
			AISI C1018		AISI C1018		ASTM B473 Alloy 20 (CARP 20Cb3) <sup>®</sup> ASTM B335 Hastelloy B <sup>®</sup>	
					. 113. 3.310		ASTM B574 Hastelloy C <sup>®</sup> 276	
							ASTM A123 Galvanized steel	
	Handw			ASTM A216 Carbon			None	
	Nut wh	eel or lever		ASTM A109 Corbon			None	
		pocking		ASTM A108 Carbon	Steet AISI UTUZU		None Teflon®	
	Old55 [	acking		Graphite co	mposite		Viton <sup>®</sup>	
	Glass p	acking gland					ASTM A276 316/316L STS	
							ASTM A276 304/304L STS	
				MPIF SS-316N2-33 3	316 STS (sintered)		ASTM A276 Duplex 2205 STS ASTM B164 Monel® 400	
							ASTM B473 Alloy 20 (CARP 20Cb3)®	
							ASTM B335 Hastelloy B®	
	Glacer	acking nut	ASTM A108	Investment cast	ASTM A108	Investment cast	ASTM B574 Hastelloy C <sup>®</sup> 276 ASTM A276 304/304L STS	
	Oldas F	acking nut	Carbon steel	316 STS	Carbon steel	316 STS	ASTM A276 Duplex 2205 STS	
				310 313		310 313	ASTM B164 Monel® 400	
			AISI C1018		AISI C1018		ASTM B473 Alloy 20 (CARP 20Cb3) <sup>®</sup> ASTM B335 Hastelloy B <sup>®</sup>	
							ASTM B574 Hastelloy C <sup>®</sup> 276	
	0		ACTM AAOO O	ACTIVACT	ACTM AAOO O	ACTIVACE	ASTM A123 Galvanized steel	
	Guard	rods	ASTM A108 Carbon steel	ASTM A276	ASTM A108 Carbon steel	ASTM A276	None	
			AISI C1018	304/304L STS	AISI C1018	304/304L STS		
	Lever			ASTM A395 D	uctile iron		None	

SERIES N2/K2 OFFSET PATTERN GAUGECOCKS

TABLE 9 - SERIES N2/K2 STANDARD/OPTIONAL FEATURES

		N	2A	K	2A	N2B K2B			N2C		K2C		
Feature		Std.	Opt.	Std.	Opt.	Std.	Opt.	Std.	Opt.	Std.	Opt.	Std.	Opt.
Pattern													
Offset		X	-	X	-	Χ	-	X	-	X	-	X	-
Bonnet													
Integral		X	-	-	-	Χ	-	-	-	X	-	-	-
Union		-	-	X	-	-	-	X	-	-	-	Х	-
Gauge connection													
Stuffing box	%" glass diameter	X	-	X	-	-	-	-	-	-	-	-	-
	¾" glass diameter	-	-	-	-	Χ	-	X	-	Х	-	Χ	-
Vessel connection													
Union	1/2" NPTM	Х	-	X	-	-	-	-	-	-	-	-	-
	¾" NPTM	-	-	-	-	Χ	-	X	-	-	-	-	-
	1" NPTM (non floating)	-	-	-	-	-	-	-	-	Χ	-	Χ	-
Solid shank	1/2" NPTM	-	Χ	-	Χ	-	-	-	-	-	-	-	-
	¾" NPTM	-	-	-	-	-	Χ	-	Χ	-	-	-	-
	1" NPTM	-	-	-	-	-	-	-	-	-	Χ	-	Χ
Socketweld	½" Male	-	Χ	-	Χ	-	-	-	-	-	-	-	-
	¾" Male	-	-	-	-	-	Χ	-	Χ	-	-	-	-
	1" Male	-	-	-	-	-	-	-	-	-	Χ	-	Χ
Flanged		-	Χ	-	Χ	-	Χ	-	Χ	-	Χ	-	Χ
Spherical union	½" NPTM	-	Χ	-	Χ	-	-	-	-	-	-	-	-
	¾" NPTM	-	-	-	-	-	Χ	-	Χ	-	-	-	-
Vent connection													
¾" NPTF		Х	-	X	-	Χ	-	X	-	Χ	-	Χ	-
Drain connection													
½" NPTF		X	-	X	-	Χ	-	X	-	Χ	-	Χ	-
Ball check shut-off													
Horizontal lower and	d upper gaugecocks	Х	-	X	-	Χ	-	X	-	Χ	-	Χ	-
	ontal upper gaugecocks*	-	Χ	-	Χ	-	Χ	-	Χ	-	Χ	-	Χ
Omitted*		-	Χ	-	Χ	-	Χ	-	Χ	-	Χ	-	Χ
Vacuum - horizontal	upper and lower	-	Χ	-	Χ	-	Χ	-	Χ	-	Χ	-	Χ
Seat													
Integral		X	-	-	-	Χ	-	-	-	Χ	-	-	-
Threaded (renewable	e)	-	-	Х	-	-	-	Х	-	-	-	Χ	-
Backseating		-	-	-	Χ	-	-	-	Χ	-	-	-	Χ
Handwheel													
w/ standard pitch threads		X	-	X	-	Χ	-	X	-	Χ	-	Χ	-
w/ quick closing threads		-	Х	-	Χ	-	Х	-	Χ	-	Χ	-	Χ
Lever		1		1				1					
w/ quick closing thre	ead (¼ turn)	-	Χ	-	Χ	-	Χ	-	Χ	-	Χ	-	Χ
Guard rods (4 per ga													
1/4" (6.4 mm) diamete		_	Χ	_	Χ	-	Χ	-	Χ	-	Χ	-	Χ

<sup>\*</sup> Acceptable for ASME service

SERIES N7 STRAIGHT PATTERN GAUGECOCKS

### **OVERVIEW**

The N7 series consists of model N7A and N7B. They are offered in a choice of bronze, iron, steel and stainless steel constructions, in  $\frac{1}{2}$ " to  $\frac{3}{4}$ " (DN 15 to 20) sizes with a wide range of features in straight pattern design.

Pressure (max.): 500 psi at 100°F (34.5 bar at 38°C) Temperature range: -20°F to 500°F (-29°C to 260°C)

### **FEATURES**

- Straight pattern.
- Integral bonnet.
- Rigid vessel connection.
- Ball check shut-off prevents loss of process fluid in the event of an accidental breakage of the tubular glass.
- Integral drain cock.
- Variety of vessel connections available.

A variety of optional features are available when specified. Combinations of optional features and materials are available. Each combination is designated by the model number in the features table. Optional materials can be specified for the gaugecock body and trim (trim consists of the stem, stem packing retainer and ball check). Standard and optional materials are available for service as described by ASTM Specifications.

### **ASME Boiler Code**

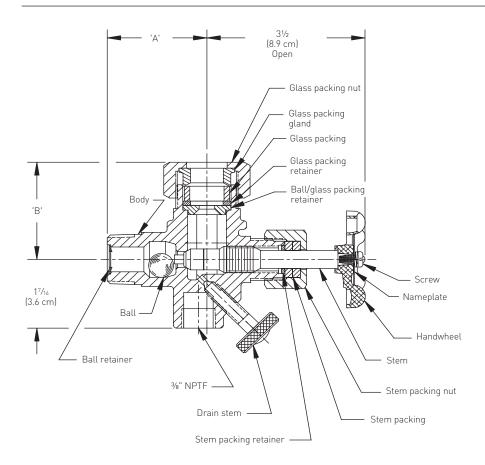
Series N7 gaugecock sets that are acceptable for ASME Boiler Code are available as an option. These gaugecock sets have a vertical rising ball check shut-off in the lower gaugecock and a horizontal ball in the upper gaugecock.

# TABLE 15 - CENTER-TO-CENTER AND GUARD ROD DIMENSIONS (SEE DIMENSIONS ON PAGE 3)

	CENTER TO CENTER AND COARS ROD BITTERS	5115 (522 511 1211516115 611 1 AGE 6)
Model	Dimension X, in. (cm)	Dimension Y, in. (cm)
All models	2 (5.1)	3/4 (1.9)

# TABLE 16 - PRESSURE/TEMPERATURE (SUBJECT TO LIMITATIONS OF TUBULAR GLASS)

IADEL IO III	LOSONL/ I LIMI L	INATORE (SOD	LOI TO LIMITA	110115 01 1000	LAIT OLASS,			
		Ma	ximum working p	ressure, psi (kPa	at temperatures	to:		
Model	W	ith standard Neop	rene glass packi	ng	With opti	onal Teflon® glass	s packing	
	-20°F (-29°C)	100°F (38°C)	200°F (93°C)	300°F (149°C)	400°F (204°C)	450°F (232°C)	500°F (260°C)	Max. steam pressure
Bronze								
N7A	200 (1380)	200 (1380)	190 (1310)	165 (1140)	125 (860)	-	-	125 (860)
N7B	400 (2760)	400 (2760)	385 (2650)	335 (2310)	250 (1720)	-	-	250 (1720)
Ductile iron								
N7A, N7B	500 (3450)	500 (3450)	460 (3170)	375 (2580)	290 (2000)	250 (1720)	-	350 (2410)
STL, STS								
N7A, N7B	500 (3450)	500 (3450)	500 (3450)	500 (3450)	500 (3450)	500 (3450)	500 (3450)	350 (2410)



**TABLE 17 - SERIES N7 DIMENSIONS** 

	.,	
Connection	Dimension 'A' in inch (cm)	Dimension 'B' in inch (cm)
Solid shank		
½" NPTM	2 (5.1)	-
3/4" NPTM	2 (5.1)	-
Socketweld		
½" Male	2 (5.1)	-
3/4" Male	2 (5.1)	-
Flanged		
½"-150 P-CL R.F.	21/4 (5.7)	-
1/2"-300 P-CL R.F.	21/4 (5.7)	-
3/4"-150 P-CL R.F.	21/4 (5.7)	-
3/4"-300 P-CL R.F.	21/4 (5.7)	-
Stuffing box		
%" Dia. glass	-	2 (5.1)
¾" Dia. glass	-	2 (5.1)
Protector nut	-	25/8 (6.7)

SERIES N7 STRAIGHT PATTERN GAUGECOCKS

# **TABLE 18 - SERIES N7 MATERIALS**

				Standard ma	nterials		
≀ef.			Bronze	Carbon steel	Iron	STS construction	
о.	Descr	ription	to -20°F	to -20°F	to -20°F	to -325°F	Optional materials
1	Body		ASME SB584 UNS C89836 Bronze	ASTM A216 Carbon steel Gr. WCB	ASTM A395 Ductile iron	ASTM A351 316/316L STS Gr. CF3M	ASTM A351 304/304L STS Gr. CF3 ASTM A890 Duplex 2205 STS Gr. 4A ASTM A494 Hastelloy B® Gr. N-12MV ASTM A743 Alloy 20 Gr. CN7M ASTM B564 Monel® 400 N04400 ASTM A494 Hastelloy C® Gr. CW12MV
4	Ball r	etainer		18-8 STS (302-	304 STSI		None
5		Ball			,	ASTM A493,	ASTM B574 Hastelloy C® 276
	Σ		316 9	Stainless steel		A262 or A276 316 STS	Borosilicate glass ASTM B473 Alloy 20 (CARP 20Cb3)® ASTM B164 Monel® 400 ASTM B335 Hastelloy B® CRS 304 STS ASTM A276 Duplex 2205 STS
7	⊢ \	Stem	ASME SB171	ASTM A582	416 STS	ASTM A276	ASTM A276 304/304L STS
		CA Alloy 464 Bronze  Stem packing retainer ASTM B291		316/316L STS	ASTM A276 Duplex 2205 STS  ASTM B164 Monel® 400  ASTM B473 Alloy 20 (CARP 20Cb3)®		
3		, ,	ASTM B291 Sheet brass	AS	TM A240 sheet (	316 STS	ASTM B335 Hastelloy B <sup>®</sup> ASTM B574 Hastelloy C <sup>®</sup> 276
)	Stem	packing		0 1:1-	4 .		Teflon®
				Graphite con	nposite		Viton® Neoprene
6	Stem	packing nut	ASME SB171 CA Alloy 464 Bronze	ASTM A108 Carbon steel AISI C1018		ASTM A276 316/316L STS	ASTM A276 304/304L STS ASTM A276 Duplex 2205 STS ASTM B164 Monet® 400 ASTM B473 Alloy 20 [CARP 20Cb3]® ASTM B335 Hastelloy B® ASTM B574 Hastelloy C® 276
3	Hand	wheel		ASTM B85 Alı	uminum		None
	Glass	packing		Neoprer	ne®		Teflon® Viton® Graphite composite
ō	Glass	packing retainer		ASTM A276 316/316L STS ASTM A276 304/304L STS ASTM A276 Duplex 2205 STS ASTM B164 Monel® 400 ASTM B473 Alloy 20 (CARP 20Cb3)®			
iΑ		al ball seat/glass retainer	MI	PIF SS-316N2-33 31			ASTM B335 Hastelloy B®
)		packing gland	MPIF CT-1000-K26 Bronze (sintered)		-316N2-33 316 S	, , , , , , , , , , , , , , , , , , , ,	ASTM B574 Hastelloy C <sup>®</sup> 276
7	Glass	packing nut	ASME SB171 CA alloy 464 Bronze	ASTM A Carbon s AISI C1	steel	ASTM A276 316/316L STS	ASTM A276 304/304L STS ASTM A276 Duplex 2205 STS ASTM B164 Monet® 400 ASTM B473 Alloy 20 (CARP 20Cb3)® ASTM B335 Hastelloy B® ASTM B574 Hastelloy C® 276
0	Guard	l rods	ASTM B21 CA	alloy 464 Naval bra	ass	ASTM A582 303 STS	None
7	Drain		,		ASTM A276	ASTM A276 304/304L STS ASTM A276 Duplex 2205 STS ASTM B164 Monel® 400 ASTM B473 Alloy 20 (CARP 20Cb3)® ASTM B335 Hastelloy B®	
							ASTM B574 Hastelloy C® 276
0	Hand	wheel screw	A	STM B633 Zinc plate	ed Carbon steel		None

SERIES N7 STRAIGHT PATTERN GAUGECOCKS

TABLE 19 - SERIES N7 STANDARD/OPTIONAL FEATURES

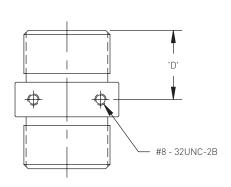
		N'	7A	N'	N7B	
Feature		Std.	Opt.	Std.	Opt.	
Pattern						
Straight		Χ	-	Χ	-	
Bonnet						
Integral		Χ	-	Χ	-	
Gauge connection						
Stuffing box	%" glass diameter	Χ	-	-	-	
	¾" glass diameter	-	-	Χ	-	
Vessel connection	(solid shank)					
Threaded	½" NPTM	Χ	-	-	-	
	¾" NPTM	-	-	Χ	_	
Socketweld	½" Male	-	Χ	-	-	
	¾" Male	-	-	-	Χ	
Flanged		-	Χ	-	Χ	
Drain connection						
3/8" NPTF		Χ	-	Χ	-	
Ball check shut-o	ff					
Horizontal lower a	nd upper gaugecocks (iron, STL, STS)	Χ	-	Χ	-	
	zontal upper (bronze)	Χ	-	Χ	-	
Vertical lower/hori	zontal upper*	-	Χ	-	Χ	
Omitted*	• •	-	Х	-	Χ	
Ball inspection pl	ug**					
Furnished		-	Χ	-	Χ	
Omitted		Х	-	Х	-	
Seat						
Integral		Х	-	Х	-	
Handwheel						
w/ standard pitch t	thread (iron, STL, STS)	Χ	-	Χ	-	
w/ quick closing th		Х	-	Χ	-	
Drain cock						
Integral		Χ	-	Χ	-	
Polished body						
Bronze		_	Χ	-	Χ	
Guard rods (4 per	gaugecock set)					
3/16" [4.8 mm] diam			Χ		Χ	

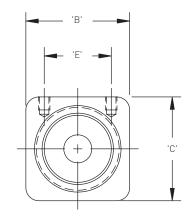
<sup>\*</sup> Acceptable for ASME service

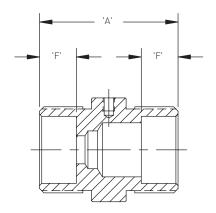
<sup>\*\*</sup> Required for ASME serrvice

# ACCESSORIES

# GLASS UNION







# **TABLE 20 - GLASS UNION DIMENSIONS**

			Dimensions in inch (cm)									
Size	Material	Α	В	С	D	Е	F					
5/8" and 3/4"	Carbon steel, brass and 316 STS	2 (5.1)	11/2 (3.8)	11/2 (3.8)	1 (2.5)	31/32 (2.5)	17/32 [1.3]					

# HYDRAULIC ADAPTER

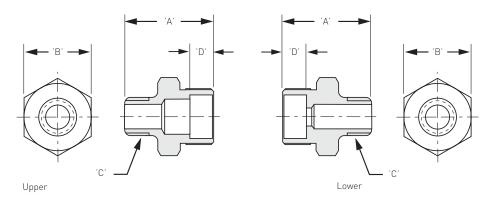


TABLE 21 - HYDRAULIC ADAPTER DIMENSIONS

			Dimensions in inch (cm)					
	Size	Material	Α	В	С	D		
Upper adapter	5/8" and 3/4"	Carbon steel, brass and 316 STS	163/64 (5.0)	11/2 (3.8)	1/2 NPT	17/32 [1.3]		
Lower adapter	5/8" and 3/4"	Carbon steel, brass and 316 STS	163/64 (5.0)	11/2 (3.8)	1/2 NPT	17/32 [1.3]		

# TABLE 22 - ACCESSORIES MATERIALS

	Dont de conintien				Outles of material
	. Part description	S	tandard materials		Optional materials
Glass			0	_	
34	Glass packing	Ne	oprene®, Max. 300°	F	Grafoil®, Max. 500°F
					Teflon <sup>®</sup> , Max. 500°F Viton <sup>®</sup> . Max. 400°F
35	01	ACT	M A240 sheet 316 S	TC	None
	Glass packing retainer				
36	Glass packing gland		16N2-33 316 STS (		None
37	Glass packing nut	ASTM A108	ASTM B21 CA	ASTM A276	None
		Carbon steel	Alloy 464	316/316L STS	
		AISI C1018	Naval brass		
100	Screw		18-8 (304) STS		None
134	Adapter	ASTM A108	ASTM B21 CA	ASTM A240	None
		Carbon steel	Alloy 464	316L STS	
		AISI C1018	Naval brass		
Hydrau	llic adapter				
11	Body	ASTM A108	ASTM B21 CA	ASTM A276	None
		Carbon steel	Alloy 464	316/316L STS	
		AISI C1018	Naval brass		
34	Glass packing	Ne	oprene®, Max. 300°	F	Grafoil®, Max. 500°F
					Teflon®, Max. 500°F
					Viton®, Max. 400°F
35	Glass packing retainer	ASTI	M A240 sheet 316 S	TS	None
36	Glass packing gland	MPIF SS-3	16N2-33 316 STS (	sintered)	None
37	Glass packing nut	ASTM A108	ASTM B21 CA	ASTM A276	None
		Carbon steel	Alloy 464	316/316L STS	
		AISI C1018	Naval brass		
Refrac	tive protector				
4	Nut	ASTM AS	i63 Gr. A steel, zinc	plated	None
4Α	Nut		Brass (knurled)		None
48	Glass		Annealed glass		PMMA (Acrylic sheet)
77	End	A	Aluminum Gr. G4A		None
100	Screw		18-8 (304) STS		None
100A	Screw	ASTM	A449 steel, zinc pla	ated	None
137	U-bolt	Al	uminum Alloy 6061		None
293	Extrusion		num Alloy UNS #A9		None
	1		,		1

del A Model N2A tubular gaugecock B Model N2B tubular gaugecock C Model N2C tubular gaugecock A Model K2A tubular gaugecock B Model K2B tubular gaugecock C Model K2C tubular gaugecock A Model K2C tubular gaugecock A Model K2C tubular gaugecock A Model N7A tubular gaugecock		CTION GUIDE - PART 1	N2A	S	S	χ	С	Α	Х	D	E	Α	PAGE C	Α	G	G	S	
A Model NZA tubular gaugecock B Model NZB tubular gaugecock C Model NZC tubular gaugecock B Model NZB tubular gaugecock C Model NZB tubular gaugecock B Model NZB tubular gaugecock dy material Carbon steel NZ, NZ, NZ contyl 316/316, SST INZ, NZ, NZ contyl 316/316, SST INZ, NZ, NZ contyl Dutulle iron [NZ only] Dutulle iron [NZ only] Alloy 20 [NZ, NZ, NZ only] Hostelly C** [NZ, NZ, NZ only] Monet* [NZ, NZ, NZ only] Monet* [NZ, NZ, NZ only] Monet* [NZ, NZ, NZ only] Alloy 20 [NZ, NZ, NZ only] Alloy 20 [NZ, NZ, NZ only] Alloy 20 [NZ, NZ, NZ only] Hastelloy C** [NZ, NZ, NZ only] Hastelloy C** [NZ, NZ, NZ only] Monet* [NZ, NZ, NZ only] Hastelloy C** [NZ, NZ, NZ only] Monet* [NZ, NZ, NZ only] None NACE environmental Seel connection size **Y** *			NZA	3	3	^	C	А	^	U	-	А	C	А	G	G	3	
B Model NZB tubular gaugencek C Model NZC tubular gaugencek A Model KZB tubular gaugencek B Model KZB tubular gaugencek C Model RCS tubular gaugencek C Model RCS tubular gaugencek C Model RCS tubular gaugencek D Model NZA tubular gaugencek dy materiat Carbon steel (NZ, NZ, KZ only) 316/314. SST (NZ, NZ only) Bronze (NZ only) D JUCTIL iron (NZ only) D JUCTIL iron (NZ only) Alloy ZD (NZ, NZ, KZ only) Hostelloy "C* (NZ, NZ, KZ only) Hostelloy "C* (NZ, NZ, KZ only) Hostelloy "C* (NZ, NZ, KZ only) Hostelloy (NZ, NZ, NZ only) Hostelloy (NZ, NZ, NZ only) Hostelloy (NZ, NZ, NZ only) Souch (NZ, NZ, NZ only) Hostelloy (NZ, NZ, NZ only) Souch (NZ, NZ, NZ only) Hostelloy (NZ, N																		
C Model NZC tubular gaugecock A Model KZA tubular gaugecock C Model KZC tubular gaugecock C Model KZC tubular gaugecock B Model NZB tubular gaugecock B Model NZB tubular gaugecock Garbon steel (NZ, NZ, KZ only) 316/316, SST (NZ, NZ, KZ only) 316/316, SST (NZ, NZ, KZ only) Bronze (NZ only) Duttlei ron (NZ only) Duttlei ron (NZ only) Moret* (NZ, NZ, KZ only) Hastelby ("* (NZ, NZ, KZ only) Moret* (NZ, NZ, KZ only) Hastelby ("* (NZ, NZ, KZ only) Hastelby (NZ, NZ, KZ only) Hastelby (NZ, NZ, KZ only) Moret* (NZ, NZ, KZ only) Moret* (NZ, NZ, KZ only) 306/304, SST (NZ, NZ, NZ, NZ, NZ, NZ, NZ, NZ, NZ, NZ,																		
A Model KZB tubular gaugecock C Model KZB tubular gaugecock C Model KZB tubular gaugecock A Model KZB tubular gaugecock B Model KZB tubular gaugecock  B Model KZB tubular gaugeck  B Model KZB tubular gauge  B Model KZB tubular	N2B																	
B Model KZP tubular gaugecock C Model KZP tubular gaugecock B Model NTA tubular gaugecock B Model NTA tubular gaugecock G Madel NTA tubular gaugecock B Model NTA tubular gaugecock G Material Carbon steel IN7, N2, K2 onlyl Bronze IN7, N2, K2 onlyl Bronze IN7 only] Ductile iron IN7 onlyl Ductile iron IN7 onlyl Monoe* IN7, N2, K2 onlyl Hastelloy C** (N7, N2, K2 only) Monoe* IN7, N2, K2 onlyl Hastelloy C** (N7, N2, K2 only) 30/30/30/3 S51 IN7, N2, K2 onlyl Hastelloy C** (N7, N2, K2 only) Monoe* IN7, N2, K2 onlyl Monoe* IN7, N2, N2, M2, N2 MACO MR-01-75 and/or MR-0103 None NAC6 environmental Sect connection size  W* W* M*	N2C																	
C Model KVZ tubular gaugecock A Model KVZ tubular gaugecock B Model KVZ tubular gaugecock Gy material Carbon steel IN7, N2, K2 only) 316/316L SST (N7, N2, K2 only) Bronze IN7 only) Duttile iron IN7 only) Alluy 20 (N7, N2, K2 only) Monel* (N7, N2, K2 only) Hastellay *C** (N7, N2, K2 only) Hastellay *C** (N7, N2, K2 only) Monel* (N7, N2, K2 only) Hastellay *C** (N7, N2, K2 only) Monel* (N7, N2, K2 only) Bronze Istandard on Carbon steel and ductile iron body) 316/316L SST (standard on Sto Sto body, N7, N2, K2 only) Bronze Istandard on bronze body, N7 only) Alluy 20 (N7, N2, K2 only) Monel* (N7, N2, K2 only) Hastellay *C** (N7, N2, K2 only) Hastellay *C** (N7, N2, K2 only) Monel* (N7, N2, K2 only) Monel* (N7, N2, K2 only) Sold-Standard MR-0103 None NACE environmental.  Sset connection size **V** 1** 1** 1** 1** 1** 1** 1** 1** 1	K2A																	
A Model N78 tubular gaugecock by materiat Carbon steel (N7, N2, K2 only) 316/314L S57 (N7, N2, K2 only) Bronze (N7 only) Duttile iron (N7 only) Alloy 20 (N7, N2, K2 only) Monet (N7, N2, N2, N2, N2, N2, N2, N2, N2, N2, N2	K2B																	
B Model N7B tubular gaugecock dy material Carbon steel (N7, N2, K2 only) 316/316L SST (N7, N2, K2 only) Bronze (N7 only) Ductile iron (N7 only) Ductile iron (N7 only) Alloy 20 (N7, N2, K2 only) Hastelloy C" (N7, N2, K2 only) Hastelloy C" (N7, N2, K2 only) Hastelloy C To (N7, N2, K2 only) material 416 SST (standard on Carbon steel and ductile iron body) 316/316L SST (standard on 316 SST body, N7, N2, K2 only) Bronze (standard on bronze body, N7 only) Hastelloy C" (N7, N2, K2 only) Monel" (N7, N2, K2 only) Hastelloy C" (N7, N2, K2 only) Hastelloy C" (N7, N2, K2 only) Monel" (N7, N2, K2 only) Monel (N7, N2, N2 only) CE MR-01-75 and/or MR-0103 None NACE environmental ssel connection size ½" ½" 1" Sest connection type NPT male union NPT (female union Socket weld female union Pophorical union NPT mate Solid shank NPT mate Solid shank SW male Raised face SO Flat	K2C	Model K2C tubular gaugecock																
Carbon steel (N7, N2, K2 only)	N7A	Model N7A tubular gaugecock																
Carbon steel (N7, N2, K2 only) 316/316L SST (N7, N2, K2 only) Bronze (N7 only) Duttle iron (N7 only) Alloy 20 (N7, N2, K2 only) Monet" (N7, N2, K2 only) Monet" (N7, N2, K2 only) Mastelloy "C" (N7, N2, K2 only) Moretal 416 SST (standard on Dronze body, N7, N2, K2 only) Bronze (standard on bronze body, N7 only) Alloy 20 (N7, N2, K2 only) Monet" (N7, N2, K2 only) Monet" (N7, N2, K2 only) Mostelloy "C" (N7, N2, K2 only) Mostelloy "C" (N7, N2, K2 only) CE MR-01-75 and/or MR-0103 None NACE environmental sset connection size  ½" ½" ½" ½" ½" ½" ½" ½" ½" ½" ½" ½" ½"	N7B	Model N7B tubular gaugecock																
316/316L SST (N7, N2, K2 only) Bronze (N7 only) Alloy 20 (N7, N2, K2 only) Monet <sup>®</sup> (N7, N2, K2 only) 306/306L SST (N7, N2, K2 only) material 416 SST (standard on Carbon steel and ductile iron body) 316/316L SST (standard on 316 SST body, N7, N2, K2 only) Bronze (standard on bronze body, N7 only) Alloy 20 (N7, N2, K2 only) Monet <sup>®</sup> (N7, N2, K2 only) Monet <sup>®</sup> (N7, N2, K2 only) Monet <sup>®</sup> (N7, N2, K2 only) GEMR-01-75 and/or MR-0103 None NACE environmental ssel connection size ½	Body	material																
Bronze (N7 only) Ductile iron (N7 only) Alloy 20 (N7, N2, K2 only) Monel* (N7, N2, K2 only) Monel* (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) mmaterial 416 SST (standard on Carbon steel and ductile iron body) 316/316L SST (standard on 316 SST body, N7, N2, K2 only) Bronze (standard on bronze body, N7 only) Alloy 20 (N7, N2, K2 only) Monel* (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) CE MR-01-75 and/or MR-0103 None NACE environmental seel connection size %* 1* Seel connection size %* 1* Seel connection (N7 only) Socket weld freale union Socket weld freale union Socket weld freale union Spherical union NPT male Solid shank NPT male Solid shank SW mate Raised face SO Fital fa	0	Carbon steel (N7, N2, K2 only)																
Bronze (N7 only) Ductile iron (N7 only) Alloy 20 (N7, N2, K2 only) Monel* (N7, N2, K2 only) Monel* (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) mmaterial 416 SST (standard on Carbon steel and ductile iron body) 316/316L SST (standard on 316 SST body, N7, N2, K2 only) Bronze (standard on bronze body, N7 only) Alloy 20 (N7, N2, K2 only) Monel* (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) CE MR-01-75 and/or MR-0103 None NACE environmental seel connection size %* 1* Seel connection size %* 1* Seel connection (N7 only) Socket weld freale union Socket weld freale union Socket weld freale union Spherical union NPT male Solid shank NPT male Solid shank SW mate Raised face SO Fital fa	5	-																
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Monet* (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) 304/304. SST (N7, N2, K2 only) m material 416 SST (standard on Carbon steel and ductile iron body) 316/316. SST (standard on 316 SST body, N7, N2, K2 only) Bronze (standard on bronze body, N7 only) Altoy 20 (N7, N2, K2 only) Monet* (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) Hastelloy C** (N7, N2, K2 only) CEMR-01-75 and/or MR-0103 None NACE environmental Sect connection size %* %* 1" Sest connection type NPT male union NPT female union Socket weld male union Socket weld female union Socket weld female union Socket weld female union NPT male Solid shank SW male Raised face SO Flat face SO Flat face SO Poll 300 Poll 400 Poll 300 Poll 400 Poll 300 Poll 400 Pol	A																	
Hastelloy *C** (N7, N2, K2 only) 304/304L SST (N7, N2, K2 only) mmaterial  416 SST (standard on Carbon steel and ductile iron body) 316/316L SST (standard on 316 SST body, N7, N2, K2 only) Bronze (standard on bronze body, N7 only) Alloy 20 (N7, N2, K2 only) Monel* (N7, N2, K2 only) Monel* (N7, N2, K2 only) 304/304L SST (N7, N2, K2 only)  CE MR-01-75 and/or MR-0103 None NACE environmental  Ssel connection size  ***  ***  ***  ***  **  **  **  **	n M																	
304/30£L SST [N7, N2, K2 only] m material 416 SST [standard on Carbon steel and ductile iron body] 316/31£L SST [standard on 516 SST body, N7, N2, K2 only] Bronze [standard on bronze body, N7 only] Alloy 20 [N7, N2, K2 only] Monte! [N7, N2, K2 only] Hastelloy 'C** [N7, N2, K2 only] Hastelloy 'C** [N7, N2, K2 only] Solvanda L SST [N7, N2, K2 only]  CE MR-01-75 and/or MR-0103 None NACE environmental sseel connection size  1/2** 1**  ***  ***  ***  ***  ***  **	H																	
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416 SST (standard on Carbon steel and ductile iron body) 316/316L SST (standard on 316 SST body, N7, N2, K2 only) Bronze (standard on bronze body, N7 only) Altoy 20 (N7, N2, K2 only) Monel® (N7, N2, K2 only) Hastelloy "C" (N7, N2, K2 only) Hastelloy "C" (N7, N2, K2 only) Body (SST (N7, N2, K2 only) Monel® (N7, N2, K2 only) CE MR-01-75 and/or MR-0103 None NACE environmental Sect connection size  "y" "" "" "" "" "" "" "" "" "" "" "" "																		
316/316L SST [standard on 316 SST body, N7, N2, K2 only] Bronze [standard on bronze body, N7 only] Altoy 20 [N7, N2, K2 only] Monet <sup>®</sup> [N7, N2, K2 only] Hastelloy 'C.® [N7, N2, K2 only] 304/304L SST [N7, N2, K2 only] CE MR-01-75 and/or MR-0103 None NACE environmental ssel connection size 'y.º '3/4" 1" 1" ssel connection type NPT male union NPT female union Socket weld male union Socket weld female union Socket weld fe			1.1. (2)															
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Alloy 20 (N7, N2, K2 only) Monete* (N7, N2, K2 only) Hastelloy* C*** (N7, N2, K2 only) 304/304.5ST (N7, N2, K2 only)  CE MR-01-75 and/or MR-0103 None NACE environmental  sset connection size  1/2** 9/4** 1***  sset connection type NPT male union NPT female union Socket weld male union Socket weld female union Socket weld female union Socket weld female union Sothet weld female union Spherical union NPT male Solid shank NPT male Solid shank SW male Raised face SO Flat face SO Flat face SO PLat face SO PCL 150 PCL 300 PCL 400  use connection size  9/4**	5			K2 onlyJ														
Monel® (N7, N2, K2 only) Hastelloy Cr® (N7, N2, K2 only) 304/304L SST (N7, N2, K2 only)  CE MR-01-75 and/or MR-0103 None NACE environmental  ssel connection size  1/2* 3/4* 1*  Ssel connection type NPT male union NPT female union Socket weld male union Socket weld male union Socket weld female union Sochet weld female union Soherical union NPT male Solid shank NPT male Solid shank SW male Raised face SO Flat face SO Flat face SO Plat face SO PC L 300 P CL 300 P CL 400  use connection size  5/6*	В		only)															
Hastelloy 'C'* (N7, N2, K2 only)  304/304L SST (N7, N2, K2 only)  CE MR-01-75 and/or MR-0103  None  NACE environmental  ssel connection size  '/*'  '\u00e4"  1"  ssel connection type  NPT male union  NPT female union  Socket weld male union  Socket weld male union  Socket weld female union  Socket weld female union  Solid shank NPT male  Solid shank NPT male  Solid shank SW male  Raised face SO  Flat face SO  essure class (if flanged)  None  P CL 150  P CL 300  P CL 300  P CL 600  uge connection size  *\u00e4"	A																	
304/304L SST (N7, N2, K2 only)  CE MR-01-75 and/or MR-0103  None  NACE environmental  ssel connection size  1/2" 3/4" 1"  ssel connection type  NPT male union  NPT female union  Socket weld male union  Socket weld male union  Socket weld male union  Socket weld male union  Solid shank NPT male  Solid shank NPT male  Solid shank SW male  Raised face SO  ssure class (if flanged)  None  P CL 150 P CL 300 P CL 300 P CL 600  uge connection size  5/6"	М																	
None NACE environmental  Seel connection size  V/*  ¾*  1*  Seel connection type  NPT male union  NPT female union  Socket weld female union  Socket weld female union  Socket weld female union  Soherical union NPT male  Solid shank NPT male  Solid shank SW male  Raised face SO  Flat face SO  Plat face SO  Poct 150  Poct 150  Poct 300  Poct 400  use connection size  %*  **  **  **  **  **  **  **  **  *	Н	Hastelloy 'C'® (N7, N2, K2 only)																
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NACE environmental  ssel connection size  1/2"  3/4"  1"  ssel connection type  NPT male union  NPT female union  Socket weld male union  Socket weld female union  Socket weld female union  Solid shank NPT male  Solid shank NPT male  Solid shank SW male  Raised face SO  Flat face SO  essure class (if flanged)  None  P CL 150  P CL 300  P CL 300  P CL 600  uge connection size  3/4"	NACE	MR-01-75 and/or MR-0103																
ssel connection size  1/2" 3/4" 1"  ssel connection type  NPT male union  NPT female union  Socket weld male union  Socket weld female union  Spherical union NPT male  Solid shank NPT male  Solid shank SW male  Raised face SO  Flat face SO  essure class (if flanged)  None  P CL 150  P CL 300  P CL 300  P CL 600  uge connection size  5/6"	X	None																
W''  W''  W''  W''  W''  W''  W''  W''	Ε	NACE environmental																
%" 1" ssel connection type  NPT male union  NPT female union  Socket weld male union  Socket weld female union  Socket weld female union  Solid shank NPT male  Solid shank NPT male  Solid shank SW male  Raised face SO Flat face SO  PSSure class (if flanged)  None  P CL 150 P CL 300 P CL 300 P CL 600  use connection size  %"	/esse	el connection size																
1" ssel connection type  NPT male union  NPT female union  Socket weld male union  Socket weld female union  Socket weld female union  Spherical union NPT male  Solid shank NPT male  Solid shank SW male  Raised face SO  Flat face SO  essure class (if flanged)  None  P CL 150  P CL 300  P CL 300  P CL 600  uge connection size  5/6"	С	1/2"																
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Socket weld female union Spherical union NPT male Solid shank NPT male Solid shank SW male Raised face SO Flat face SO PL 150 P CL 150 P CL 300 P CL 600  uge connection size 5%"	3	NPT female union																
Spherical union NPT male Solid shank NPT male Solid shank SW male Raised face SO Flat face SO essure class (if flanged) None P CL 150 P CL 300 P CL 600 uge connection size 5%"	С	Socket weld male union																
Spherical union NPT male Solid shank NPT male Solid shank SW male Raised face SO Flat face SO essure class (if flanged) None P CL 150 P CL 300 P CL 600 uge connection size 5%"	D	Socket weld female union																
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Raised face S0 Flat face S0 essure class (if flanged) None P CL 150 P CL 300 P CL 600 uge connection size 5%"	(																	
Flat face SO  essure class (if flanged)  None  P CL 150  P CL 300  P CL 600  uge connection size  5%"	N																	
Possure class (if flanged) None PCL 150 PCL 300 PCL 600 Use connection size 5%"	•																	
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P CL 150 P CL 300 P CL 600 uge connection size 5%"	1 ess																	
P CL 300 P CL 600  uge connection size  5%"	1																	
P CL 600  uge connection size  5%"																		
uge connection size  5%"	,																	
5/8"	5 																	
4 <u>1</u>	-																	
	i	3/4"																

SELECTION GUIDE - PART 2

PART 1 - PAGE 19 N2A S S X (	C A X		ECTION GUIDE - PART 2	Е	Α	С	Α	G	G	S	S	XX
NZA 5 5 A C	, A A		nt connection size	-	А	C	А	G	G	3	3	^^
		X	None (standard on N7)									
		В	3/8"									
		С	1/2"									
		Е	³¼" (standard on N2, K2)									
		Ver	nt connection type									
		X	None (standard on N7)									
		Α	NPT female (standard on N2, K2)									
		В	Socket weld female									
		F	Plugged									
		Dra	nin connection size									
		Х	None									
		В	3/8" (standard on N7)									
		C	½" (standard on N2, K2)									
		E	3/4"									
			in connection type									
		X	None									
		Α	NPT female (standard)									
		В	Socket weld female									
		F	Plugged									
		G	Drain cock									
		Ste	m packing material									
		N	Neoprene®									
		G	Grafoil® (standard)									
		Т	Teflon®									
		٧	Viton®									
		Gla	ss packing material									
		N	Neoprene (standard on N7)									
		G	Grafoil® (standard on N2, K2)									
		Т	Teflon®									
		٧	Viton®									
			m operation									
IOTES		S	Standard close w/ handwheel (standard)									
lastelloy® is a registered tr	ademark of	Α	Quick close w/ lever									
laynes International, Inc.		В	Quick close w/ handwheel									
		С	Standard close, back seat w/ handwheel (N2,K2	only)								
Grafoil® is a registered trad	emark of	D	Quick close, back seat w/ lever (N2,K2 only)									
GrafTech International.	sindik oi	Е	Quick close, back seat w/ handwheel (N2,K2 only	y)								
narrech internationat.		F	Standard close w/ lever									
		Pai	nt specification									
Monel® is a registered trade		Х	None									
pecial Metals Corporation.		S	Standard									
			tions									
iton® and Teflon® are regis	tered	-	X None									
rademarks of the Chemour		*	Smooth body (N7 only)									
	1 - 3.	*	Wire glass, plastic or sheet metal protector									
DCb3® is a registered trade	mark of	*										
			Horizontal ball check									
arpenter Technology Corp	oration.	*	Vertical rise ball check lower gaugecock									
		*	ACMEtisal size ball abasis lasses assessed a	dua								
			ASME vertical rise ball check lower gaugecock p	ilug								
Federalloy® is a registered t	rademark of	*	Ball check shut off omitted (ASME)  Vacuum service vessel connection (N2,K2 only)	nug					* (	Option c	ode ass	igne

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